



THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar



Lattice Network Codes Based on Eisenstein Integers for Wireless Multiple-Access Relay Networks

by

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Abstract

In this work we investigate lattice network codes (LNCs) constructed from lattices over the ring of Eisenstein integers. After revisiting the basic model of compute-and-forward and lattice codes for wireless multiple-access relay networks, we introduce quantization and encoding algorithms for LNCs over Eisenstein integers, whose complexities turn out to be in the same order as in the Gaussian integer based LNCs. Then, we derive a unified union bound estimation (UBE) of the decoding error probability, which applies to both the Gaussian and Eisenstein integer based LNCs. We show that the nominal coding gain and the shaping gain of a baseline LNC based on Eisenstein integers are, respectively, 0.625 dB and 0.167 dB. We also compare the error probability performance of baseline LNCs and it is shown that the Eisenstein integer based LNC is better than the Gaussian integer based LNC with the same constellation size.

Biography

Jinhong Yuan received the B.E. and Ph.D degrees in electronics engineering from Beijing Institute of Technology, Beijing, China, in 1991 and 1997, respectively. From 1997 to 1999 he was a Research Fellow at the School of Electrical Engineering, the University of Sydney, Sydney, Australia. In 2000 he joined the School of Electrical Engineering and Telecommunications, the University of New South Wales, Sydney, Australia, where he is currently a Professor for Telecommunications of the school. He has published two books, two book chapters and over 150 papers in telecommunications journals and conference proceedings. His publication is available from <http://www2.ee.unsw.edu.au/wcl/JYuan.html>. His current research interests include error control coding and information theory, communication theory, and wireless communications.

****ALL ARE WELCOME ****